Office of Force Transformation
Department of Defense
Transformation Trends 04 May 2004

"This is the time to press forward with transformation of our nation's defenses. The men and women in uniform who are risking their lives in Iraq, in Afghanistan and elsewhere in the war on terror need our support and they need the tools to prevail in this war and to prevail and prepare for the next.".

Defense Secretary Donald Rumsfeld, March 2004

The following transcript is an interview conducted with Art Cebrowski, Director, Office of Force Transformation, for the PBS Nova production of "Battle Plan Under Fire." The interview conducted on January 15, 2004, by Scott Willis, producer of "Battle Plan Under Fire," and edited by Peter Tyson, editor in chief of NOVA online.

Transforming Warfare

The uncanny effectiveness of "smart" bombs and unmanned aerial vehicles like the Predator has shown to even the most casual observer of the conflicts in Iraq and Afghanistan that the nature of war is undergoing a profound metamorphosis. It's moving from an Industrial-Age massing of troops with most intelligence held by commanders to an Information-Age era of special operations, precision weapons, and a level of interconnectivity that goes right down to the individual soldier. This sea change goes by the name of "transformation," and its key doctrine is "network-centric warfare," a strategy that has friendly combatants networked together for a previously unknown degree of fighting effectiveness. In this interview, Adm. Arthur Cebrowski, Director of Force Transformation

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at the Pentagon, describes this new kind of warfare and why he believes it to be more "moral" than what it is replacing.

NOVA: *What did you see in Afghanistan in terms of the improvisation of tactics and the melding of high-tech and low-tech that was behind our success there? What lessons did you walk away with?*

Cebrowski: I drew several lessons from Afghanistan, one being that the conflict was not the Special Operations Forces doing thus and so, or the U.S. Marine Corps doing thus and so. Rather it was a commander of U.S. Central Command as a joint commander operating his joint force. Nobody did anything by themselves. It was a level of teamwork that was far grander and more sophisticated than anything we had seen before, although we've seen even more of it since then, and even more robustly so. But that was one of the things that stands out.

Another was that joint warfare was moving from what's called the operational level of war, which generally has to do with the broad sweep of how force is brought to bear, down to the tactical level of war, which is the transaction level. That's the level where violence is actually applied. Before, it was almost exclusively the domain of an individual service. In Afghanistan we found a level of teamwork that led us all to believe that we were looking at indicators of a new level of jointness, a new concept of joint interdependency that we hadn't seen before. That was one of the more stunning lessons.

Still another was ingenuity. The ingenuity of our people is just marvelous. Where does that come from? It doesn't happen by accident. It happens with education; it happens with training, exposure, and experience. If you're going to achieve these stunning results, it requires preparation, and our people are quite well prepared. It's one of our great national advantages.

NOVA: *Did that prove the heart of the concept of transformation?*

Cebrowski: The war in Afghanistan was another example of transformation in action. Historically, what happens when something like that appears is the bulk of a military will say, "Well, that's an exception. You can't learn anything from that because that's really not the way we're going to go to war."

The fact is, you don't ever go to war the way you say you're going to go to war. Every case is unique. So having well-drilled doctrine in great detail is of limited utility, because you don't actually behave that way in the event itself. You find people reach for things that are different. No commander has ever been rewarded by history for slavish adherence to some doctrine published in a glossy brochure. Rather, commanders are rewarded for recognizing a situation and being able to cobble together a path to victory using resources that anyone less would have considered inadequate. That's the stuff of history and of true leadership.

NOVA: *What's the historical backdrop for this newly emerging interest in transformation?*

Cebrowski: In the Industrial Age, the great focus in warfare was in what we would call the physical domain—the movement of force through time and space, which historically is where much of warfare had been focused. But recently we have found that we can inform the force. That is, we can leverage new capabilities in what we would call the information domain to develop knowledge.

At the intersection of that information domain and the physical domain, we find the appearance of precision force. So it's late in the Industrial Age and early in the Information Age that you find precision weapons appear, and you start to see the substitution of information for mass. For example, 40 or 50 years ago, it took the United States Air Force, say, 1,000 bombs to destroy a target. Now it takes just one. What's the difference? The difference is the one bomb has been informed.

But battles are won and lost in the minds of commanders, that is, in the cognitive domain. So now what you have is the information domain informing the cognitive domain. And at the intersection between those two domains, we see commanders creating new tactics and operating procedures, and recognizing new opportunities.

NOVA: *Can you give an example?*

Cebrowski: Well, in fighter versus fighter combat, we have found that fighters that have data links that allow them to share information amongst the fighter cockpits win significantly more often both day and night, in single plane as well as multi-plane scoring, than fighters who don't have such links. The reason

it happens is because the force operating in the networked condition can reach for tactics that an enemy which is not networked simply cannot reach for.

We also see the appearance, for example, of very high-speed warfare. Operation Iraqi Freedom was a very significant undertaking, but the major combat operations were completed in 21 days. That speed of advance was absolutely unheard of.

NOVA: *Is it a military that goes beyond mere kinetic action? Is it no longer enough to destroy something?*

Cebrowski: We're coming out of a period when we would go to war as a matter of national survival, and merely being able to survive the war would have been considered a success. When one considers, for example, the prospect of global nuclear war with the Soviet Union, just having come out the other side of that combat with core institutions intact would have been itself a great metric of success. That was the focus.

But now, confronted with different kinds of competitions and conflicts, we're reminded that warfare is more than combat, and combat's more than shooting. In national security interests, all the elements of national security power are brought to bear. And we think of national security not just of defense but of all else plus defense, that, yes, the power of the Department of Defense is meant to underwrite the other elements of power, but it's inadequate by itself, and it really always will be, because ultimately conflict is resolved in the incredibly complex political domain.

NOVA: *How do you feel about Millennium Challenge 2002 [a U.S. war game that involved both live field exercises and computer simulation] and the general idea of attempting to see the future of warfare?*

Cebrowski: Innovation is a leadership tool, and it's a necessary battlefield skill. How does one train leaders for that? You don't train for that with rote repetitions. You train for it with experimentation. Therefore, the Department of Defense needs a very robust experimention effort. Millennium Challenge was a very large-scale experimentation effort—very, very broad. But one of the great lessons out of Millennium Challenge is that what we really need is a very much larger number of smaller experiments

spread out over the entire force, running on a daily basis, some of them with actual equipment and forces, others in simulations or war games. We need that kind of robust activity. If we aren't doing that, then we aren't training our future leaders.

NOVA: *There are criticisms that the notion of experimentation and scientific method was influenced in Millennium Challenge by what people wanted to happen. Do you think there's an inherent danger in situations like that?*

Cebrowski: There's always a danger that we will see what we want to see. When you spend a great deal of intellectual effort in conceptualization and then have an opportunity to see that conceptualization take life, you want to see it as you envisioned it. You want to see it have the power and results for which you had hoped all along. That's just human nature.

On the other hand, there is also the raw professionalism of being able to look a colleague in the eye and say, "Well, I think you're playing that hand for more than it's worth. These are the lessons that we can feel good about and we'll go with. These are the ones we don't feel quite so good about and perhaps we ought to run another experiment or subject it to another simulation or war game or send it back to the lab altogether."

And that's what really happens. So you might get the the flush of enthusiasm out of a war game or experiment, but over time, the people who actually have to execute it and come to grips with the details of it, start to pull it apart and find out what was really there. That's what we've seen going on.

Incidentally, that's also what happens with a real combat action. You think you see the lesson, but then you want to look at it again and again, and from different points of view. You find you have debates and discussions and folks write op-ed pieces. Then you have some kind of debate and you move forward. It's really a very American sausage-making process.

NOVA: *So while it might appear that lessons aren't learned, you believe that it's a self-correcting system, that there's too much at stake?*

Cebrowski: That's right. There is too much at stake. No one's going to put troops under fire and risk a life or risk the security or interests of the nation for something that he really didn't believe was the right way to do something. No one is going to be sacrificed on the altar of transformation. We're going to do transformation, but we're going to do it in the flesh.

NOVA: *Can you describe the information architecture of the modern battlefield as was seen in Iraq?*

Cebrowski: First of all, warfare is about human behavior, and the thing that changes when one looks at network-centric warfare is that we're talking about the behavior of humans in the networked environment. We're not talking about "network" the noun here. We're talking about "to network," the verb. How do people behave when they become networked?

The fact is, they behave differently. We see it in society all the time, and it would be naive to suppose that we could have that happen in society at large and not have it happen in the military. Particularly when lives are at stake and we realize that being able to operate in a networked environment generates a new source of power for us and a great competitive advantage. There's a great desire then to network. The word "network" is key in this. It's not about passing information up and down a chain of command. It's about broad access to information so that you can develop shared awareness and shared understanding at very high speed.

NOVA: *So that's a key difference between warfare now and warfare in the Industrial Age.*

Cebrowski: Yes. In the Industrial-Age approach to command, control, and communications, at the bottom of the information chain, the least connected person was the soldier. The person who was most in harm's way was the least connected. His connections were also the most brittle. So to say we're going to move into the Information Age, and we're going give the admiral and the general all kinds of information and have them well networked and have that not extend down to the tactical level of war is absolutely wrong. It's immoral.

It's incumbent upon us to help the people at the tactical level of war—the people who are in mortal danger—to derive power and safety from being able to operate in the networked environment. That's the

thrust that we see going on in this. And those people can perform ever so much better. We have an obligation to do that.

NOVA: *Can you give an example of how soldiers get networked?*

Cebrowski: Well, for example, in Operation Iraqi Freedom, we saw the emergence of the personal role radio. You might have seen some of the soldiers and marines with a little boom mike coming out from under their helmet. They never had that before. Now you can't get that away from them, because in the din of combat, they have found that by being connected that way, they could reach for tactics that are more effective than they could reach for before. They could better maintain their situational awareness, their unit cohesiveness.

NOVA: *At some point, doesn't "network-centricity" disappear, and it's one person against the other?*

Cebrowski: For some forms of combat, that's absolutely true. But what you'd like is to have your super-empowered individual be able to defeat the other side's super-empowered individual. And the way our individual becomes super-empowered is, we make him smarter. He's well trained, he's conditioned. He's more than trained, he's educated. He has a sense of awareness of the environment, of context. It's an advantage that's absolutely marvelous. Eventually if you're talking about hand-to-hand combat, things will get pretty physical, there is no doubt about it. But other things like moral courage and physical courage come to bear as well. We have to develop those attributes.

NOVA: *Yet as recent events in Iraq show, the enemy can and does adapt to our technological and physical advantage.*

Cebrowski: Sure. One must always make assumptions about the ability of the enemy to learn. No one learns faster than someone who's being shot at. Under stress, he will retreat to more complex terrain. If he cannot fight as successfully in the commons of the sea or cyberspace, he'll retreat to the battlefield on land. Then he'll retreat to yet more complex terrain—the jungles, urban terrain. Unable to sustain himself there, he'll retreat to yet more complex terrain, ultimately the political. That's where the battle ultimately ends up being fought in a certain sense. That's what you see unfolding in Iraq.

NOVA: *In Iraq, there wasn't the level of collateral damage that could have happened, and there wasn't really a "Battleship Missouri in Tokyo Bay" moment where the war was over, the enemy was defeated. Can you talk about the perception of being defeated?*

Cebrowski: There's a temptation to say that to develop that sense in the minds of an enemy that they are, in fact, defeated, you have to kill a very large number of them, maim an even larger number, destroy a lot of infrastructure and key elements of their civilization, and then they will feel defeated.

I think that's wrong. I think we are confronted now with a new problem, in a way the kind of problem we always wanted to have, where you can achieve your initial military ends without the wholesale slaughter. Because remember, this always cuts two ways. You have a moral obligation not just to limit your own casualties and casualties of nonparticipants, but also those of the enemy itself.

So we're moving in the more moral direction, which is appropriate. Now we're confronted with the problem which is that, in traditional terms, a person feels less defeated than he was before. We need a new intellectualization for these kinds of events. We don't want to go back to the other way, the slaughter and destruction. We need to come to grips with this reality.

It is not a matter of warfare becoming antiseptic and casualty-free. Warfare is enormously risky. It is dangerous, it is violent, and people get hurt in it. But on the other hand, it doesn't mean it has to be done on a wholesale level. Essentially, can we win this war retail, if you will? That's what it will come down to. And this is a new problem. We're going to have to think this through. I'm reasonably certain that planning for subsequent engagements will be different to reflect that.

NOVA: *Is there is a danger in this that the science of war can lead the art of war, that technology can blind you to the warfare itself?*

Cebrowski: A useful way to think about the art and the science of warfare is that on the one hand you have technology, which is, of course, the physical expression of the science. On the other, you have the tactics, the behavior. And one is as likely to make the error in one direction as he is in the other. So you

have people who say, “Well, we don't care about the technology. We win based on courage and training and quality of leadership and good tactics.” They'll talk like that until they run out of bullets and their guns jam and the supply train fails to support them and an enemy shows up on the scene with an overwhelming capability for which they have no defense.

Similarly, we have seen people say, for example, “I have this gadget, this marvelous piece of electronic warfare. If I have this, the enemy missile can't hit me.” Then lo and behold, the enemy missile does. Because it's a fully two-sided game. Move, countermove. And the moves and countermoves take place on both sides of the coin, on the tactic side and on the technology side. So you have tactical moves to counter technologies, and technology moves to counter tactics.

That's part of the reason why you must do something like we're engaged in now, transformation—a decidedly serious effort not to be static. Because if you are static, you’re a fixed target, you’re at risk.

NOVA*: In a sense, you are a Pied Piper. Where are you leading us?*

Cebrowski: The objective of transformation is a broad and sustained competitive advantage. It doesn't mean you win with certainty, but done well, the odds will be on your side. And in combat, that may be the best you can hope for. So that's what we try to do. Transformation doesn't take you to a destination. Transformation is about emergent behavior for an emerging future. It's not about building a bridge to a predetermined future. It's about adaptivity and fitness. It's about preserving options.

It's also about minimizing regret or, at the very least, delaying regret. One of the things we try to do in this office is look downstream and, at various levels, identify issues of regret, those things which if we don't address them, we might dearly regret it. Sometimes that's in the realm of technology, sometimes in the realm of processes or organization.

For example, we need very badly to move to demand-centered intelligence. Right now intelligence is largely owned by the intelligence suppliers. That is dysfunctional. It is inconsistent with the basic principles of the Information Age. Increasingly we're all going to act like intelligence officers. We’ll be

able to access an expanse of information and draw conclusions, to access infomediaries to help us with the process.

That's going to be a substantial change, and one of the things that we have to confront is the dilemma of how one moves to that kind of increased access and shared awareness, and at the same time preserve security. That will be a difficult tug that will be with us for a long time. But we must engage in it. We must move forward in that area. If we don't, we will regret it.